REMARKS/ARGUMENTS

Claims 1-17 are pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of these remarks.

On page 2, the Examiner rejected claims 1-5, 7-13, and 15-17 under 35 U.S.C. 103(a) as being unpatentable over U.S. Application No. 2002/0029362 ("Stephen") in view of the instant application's disclosed prior art (the "IADPA").

For the following reasons, the Applicant submits that claims 1-5, 7-13, and 15-17 are allowable over the cited references.

Claim 1 recites:

1. A method of generating probabilities to calculate log-likelihood values in a maximum *a posteriori* (MAP) processor for samples corresponding to data, the method comprising the steps of:

(a) retrieving a first block of samples and a corresponding set of forward probabilities, wherein the block of samples correspond to states of a merged trellis, wherein the merged trellis provides combined probabilities of transition from one or more states at k-N, N an integer greater than 1, to current states at time k as the set of forward probabilities; and

(b) updating the set of forward probabilities of the merged trellis for the current state at time k, based on the block of samples and the corresponding set of forward probabilities.

According to claim 1, the merged trellis "provides combined probabilities of transition from one or more states at k-N, N an integer greater than 1, to current states at time k." Exemplary merged trellises are shown in FIGs. 2(a) and 2(b), which provide combined probabilities of transition from k-2 to k and from k-3 to k, respectively. As explained in the specification, "[b]y combining multiple intermediate time states of a trellis to form a merged trellis from time k-N to time k, the merged trellis structure exhibits a parallel structure." In contrast, in the exemplary non-merged trellis shown in prior art FIG. 1, the left portion provides probabilities of transition from k-2 to k-1, and separately, the right portion provides probabilities of transition from k-1 to k.

In rejecting claim 1, the Examiner asserts that Stephen teaches that "the merged trellis provides combined probabilities of transition from one or more states at k-1 to current states at time k as the set of forward probabilities," citing paragraphs 71-77 and 190. This is an incorrect characterization of Stephen, because Stephen does not teach a merged trellis at all. In paragraph 58, Stephen teaches that "[t]he dynamics of a time-invariant convolutional code are completely specified <u>by a single trellis section,</u> which describes the transitions (edges) between the states of the trellis at time instants k and k+1." Thus, no combined probabilities of transitions are being provided by the trellis, because the trellis accounts for transitions between only two consecutive time instants, k and k+1. As such, there can be no merged trellis, because there is nothing to combine, i.e., there are not two or more consecutive transitions whose probabilities can be merged. Accordingly, Stephen also does not disclose providing combined probabilities of transition from one or more states at k-N, where N is an integer greater than 1, since N in Stephen is limited to 1.

The Examiner then admits that "Stephen is silent about the merged trellis provid[ing] combined probabilities of transition from one or more states at k-N, [where] N is an integer greater than 1, to current states at time k as the set of forward probabilities." The Examiner attempts to supply these missing teachings by referring to FIG. 1 of the present application, concluding that the IADPA "teaches the merged trellis provid[ing] combined probabilities of transition from one or more states at k-N, [where] N may be an integer greater than 1, to current states at time k as the set of forward probabilities." FIG. 1

and the IADPA simply do not teach this. Contrary to the Examiner's assertions, FIG. 1 is not a merged trellis, such as those shown in FIGs. 2(a) and 2(b), which are merged trellises that provide combined probabilities of transition from k-2 to k and from k-3 to k, respectively. As discussed above, FIG. 1 shows a non-merged prior-art two-section trellis, where the first section provides probabilities of transition from k-2 to k-1, and the second section separately provides probabilities of transition from k-1 to k.

Correspondingly, since neither Stephen nor the IADPA discloses the use of a merged trellis, neither can possibly disclose step (b) of claim 1, "updating the set of forward probabilities of the merged trellis."

Since neither Stephen nor the IADPA teaches, discloses, or even suggests the use of a merged trellis that provides combined probabilities of transition from one or more states at k-N, N an integer greater than 1, to current states at time k, nor a step of updating the set of forward probabilities of a merged trellis, no combination of Stephen and the IADPA can render obvious claim 1.

For all these reasons, the Applicant submits that claim 1 is allowable over the cited references. For similar reasons, the Applicant submits that claims 9 and 16 are also allowable over the cited references. Since claims 2-5, 7, 8, 10-13, 15, and 17 depend variously from claims 1, 9, and 16, it is further submitted that those claims are also allowable over the cited references. The Applicant submits therefore that the rejections of claims under Section 103 have been overcome.

Claims 2, 10, and 17

Claim 2 recites:

(c) retrieving a second block of samples and a corresponding set of backward probabilities, wherein the samples correspond to states of the merged trellis, wherein the merged trellis provides cumulative probabilities of transition from one or more states at time $k+N$ to current states at time k as the set of backward probabilities; and

(d) updating the set of backward probabilities of the merged trellis for the current state at time k, based on the block of samples and the corresponding set of backward probabilities.

In rejecting claim 2, the Examiner asserts that

Stephen teaches retrieving a second block of samples and a corresponding set of backward probabilities, wherein the samples correspond to states of the merged trellis, wherein the merged trellis provides cumulative probabilities of transition from one or more states at time $k+1$ to current states at time k as the set of backward probabilities; and updating the set of backward probabilities of the merged trellis for the current state at time k based on the block of samples and the corresponding set of backward probabilities, wherein the computation of the backward probabilities are similar to the forward probabilities. Stephen is silent about the merged trellis provid[ing] combined probabilities of transition from one or more states at k-N, [where] N is an integer greater than 1, to current states at time k as the set of forward probabilities. The instant application's disclosed prior art teaches the merged trellis provid[ing] combined probabilities of transition from one or more states at k-N, [where] N may be an integer greater than 1, to current states at time k as the set of forward probabilities. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of the instant application's disclosed prior art with Stephen in order to calculate a set of forward probability values for a current state and then reduced in accordance with an a posteriori probability (APP) value based on previous state sequences for processing data input to a processor for detection and/or decoding operations.

As discussed above, neither Stephens nor the IADPA discloses the use of a merged trellis. Correspondingly, since neither Stephen nor the IADPA discloses the use of a merged trellis, neither can

possibly disclose the use of a merged trellis providing cumulative probabilities of transition as a set of backward probabilities, nor a step of updating a set of backward probabilities of a merged trellis. Thus, neither Stephen nor the IADPA teaches, discloses, or even suggests the use of a merged trellis that provides cumulative probabilities of transition from one or more states at time $k+N$ to current states at time k as the set of backward probabilities, nor a step of updating the set of backward probabilities of the merged trellis for the current state at time k. This provides additional reasons for the patentability of claim 2 over the cited references. Claims 10 and 17 are patentable for similar reasons.

Additionally, the Applicant respectfully notes that the last 11 lines of the paragraph in which the Examiner rejects claims 2, 10, and 17 (shown above with dashed underlining) do not appear to refer to backward probabilities, nor to any other language in any of these claims. Moreover, the Examiner does not specifically state which portions of Stephen and/or the IADPA the Examiner believes support a rejection of each and every element of these claims. To the extent that the Examiner maintains this rejection in a subsequent Office Action, the Applicant requests that the Examiner provide specific citation of each portion of Stephen and the IADPA that the Examiner believes supports the rejection of claims 2, 10, and 17, as well as the portion(s) of Stephen and/or the IADPA that the Examiner believes provides a motivation to combine these references to support a *prima facie* obviousness rejection of these claims.

Claims 5 and 13

Claim 5 recites that "updating the forward probability for a state in step (b) comprises the step of selecting the maximum combined probability for transitions to the current state." In rejecting claim 5, the Examiner asserts that "Stephen teaches [that] updating the forward probability for a state comprises selecting the maximum combined probability of transitions to the current state." As discussed above, in paragraph 58, Stephen teaches that "[t]he dynamics of a time-invariant convolutional code are completely specified by a single trellis section, which describes the transitions (edges) between the states of the trellis at time instants k and $k+1$." Thus, no combined probabilities of transitions are being provided by the trellis, because the trellis accounts for transitions between only two consecutive time instants, k and $k+1$, and accordingly, no selection of a maximum combined probability from a set of combined probabilities in a merged trellis is possible. The same is true for the IADPA, which also does not disclose selection of a maximum combined probability. Thus, neither Stephen nor the IADPA teaches, discloses, or even suggests selecting the maximum combined probability for transitions to the current state from a set of combined probabilities in a merged trellis. This provides additional reasons for the patentability of claim 5 over the cited references. Claim 13 is patentable for similar reasons.

The Applicant acknowledges the indicated allowability of the subject matter of claims 6 and 14. However, in view of the above remarks, the Applicant believes that all of the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Respectfully submitted,

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